Atlantic Richfield Company

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September 5, 2013

Mr. Steven Way
On-Scene Coordinator
Emergency Response Program (8EPR-SA)
US EPA Region 8
1595 Wynkoop Street
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Delivered via e-mail

Subject: August 2013 Monthly Progress Report
Rico-Argentine Mine Site – Rico Tunnels
Operable Unit OU01, Rico, Colorado

Dear Mr. Way,

This progress report describes activities conducted during the month of August, 2013 at the Rico-Argentine Mine Site (site) and activities anticipated to occur during the upcoming month. These activities are organized by task as identified in the Removal Action Work Plan. This progress report is being submitted in accordance with Paragraph 35.a of the Unilateral Administrative Order for Removal Action (the "UAO"), dated March 17, 2011.

ACTIVITIES FOR AUGUST

This section describes significant developments during the preceding period including actions performed and any problems encountered during this reporting period.

Site-Wide Activities

- Digital archives continue to be reviewed by the Atlantic Richfield (AR) project team for information that may provide a better understanding of the site. Search strategies continue to be refined to maximize to the extent feasible the recovery of information of potential use to the project team. A database of the searches performed is in development to document the use of the digital archive.
- Installed new site access gate at the St. Louis Adit/Ponds Site.
- Conducted maintenance with imported base course on the site access roads for the St. Louis Adit/Ponds Site and the 517 Shaft and Blaine Tunnel site.

Task A – Pre-Design and Ongoing Site Monitoring

- Submitted and posted the May 2013 Surface Water Sampling Report and cross sectional transect data to the project SharePoint site. https://www.aecomonline.net/projects/Rico
- Preparing and reviewing June, July and August 2013 Surface Water Sampling Reports and cross sectional transect data prior to submittal to EPA and posting to the project SharePoint site.
- The August water sampling event was initiated on August 20, 2013 and completed August 29, 2013.
- August sampling event groundwater samples and water levels were obtained from the following groundwater wells: GW-1, GW-3, GW-4, GW-5, GW-6, GW-7, EB-1, EB-2, MW-101, MW-102, MW-103, MW-104, MW-204, CHV-101S, P13-102, P13-103, MW-1 DEEP, MW-1 SHALLOW, MW-2 DEEP, MW-3 DEEP, MW-4 DEEP, MW-4 SHALLOW, MW-5 DEEP, MW-5 SHALLOW,

MW-6 DEEP, MW-6 SHALLOW, and angle boreholes AT-2 and BAH-01. The following wells were found to be dry: MW-202, MW-2 SHALLOW, and MW-3 SHALLLOW.

- During the August sampling event, surface water samples were collected from St. Louis Ponds locations DR-3, DR-4, DR-5 and DR-6.
- During the August sampling event, Dolores River water samples and flow measurements were collected from DR-1, DR-2, DR-7, DR-4-SW, and DR-G. Grab samples as well as multi-point composite samples were obtained from the referenced river locations, with the exception of DR-G, from which only a grab sample was obtained.
- During August, flumes were inspected for debris. The flumes were cleared as required.
- Downloaded available flume data for August 2013 from the Parshall flume data loggers. The most recent data was obtained from the OTT PLS pressure transducer and ultra-sonic level sensor at north flume (DR-3) and from OTT Orpheus Mini at south flume (DR-6).
- Data from the pressure transducer located in angle borehole AT-2 was collected.
- Conducted inspection of the pond system spillways, pipes, water levels and general conditions. Overall condition of the pond system was good. All spillways and pipes were observed to be flowing without obstruction.
- Downloaded available data for August 2013 from the Doppler Radar Flow Meter installed at Dolores River station DR-2. The Doppler flow meter was removed from the Dolores River at this location near the end of the month. No Doppler flow meters are currently in the Dolores River near the St. Louis Ponds site.
- Continued work on overall site Data Management System (EQuIS) development. A web-based system with site data which can be queried in a tabular format has been set up and is currently being tested and refined. A web-based system with site data which can be queried from a map is complete and being tested internally.
- Additional evaluation of potential improvements on field water data gathering and telemetry. Continued work on the antenna permit with the Town of Rico.
- Continued development of the Conceptual Site Model (CSM). A hydraulic study site walk was conducted to continue developing an understanding of site hydrogeology.

Task B – Management of Precipitation Solids in the Upper Settling Ponds

- St. Louis Adit discharge water continued to be diverted to Pond 15 during August 2013. Pond 18 has not been in use during August due to seeps and leakage from a partially buried historic plastic pipe between Pond 18 and 15 observed in November 2012. Construction plans for the repairs were completed in August and repairs of the Pond 18 pipe seep area are scheduled for September 2013.
- The St. Louis Pond system embankments flow and general conditions were inspected during August 2013. The ponds had adequate freeboard through the month. Flow into and between the ponds is not blocked and the overall condition of the embankments appeared good.
- Mobilized materials and equipment (piping and pumps) to complete the upper pond solids removal for 2013.
- Lifted Pond 13 causeway to facilitate liquid-solids separation of Ponds 11 and 12 slurry and provide access for geotechnical investigations.
- Constructed water diversion and feed pipelines to control water during the suction dredging operation. Approximately 95% of these pipelines were completed by month's end. Also staged generators and pumps for dredging operation.
- Completed a working platform adjacent to Pond 15 for solids removal work and launching platforms for the dredge adjacent to Ponds 11 and 12.
- Continued maintaining pond dikes as required throughout the project.
- Imported and moved the following quantities of materials:
    - 102.79 tons of rip rap
    - 2448.17 tons of road base
    - 1456.54 tons of Type A material

- The following work tasks were underway at month's end:

Description	Percent Complete
Mobilization / Demobilization	75-percent
Contractor Site Safety	Ongoing
Pond Dike Work Area Preparation	85-percent
Water Management	50-percent
Dike Construction and Repairs	95-percent
Ponds 11 and 12 Suction Dredge Removal	10-percent
Miscellaneous Tasks	Ongoing

Task C – Design and Construction of a Solids Repository

- Continued design of a phased solids repository at the South Stacked Repository – Option A (SSR-A) site.
- Continued work on geotechnical analyses of alternative solids drying facility and repository sites, focusing current attention on Pond 13 and the SSR-A.
- Continued evaluation of geotechnical field and laboratory test data on Pond 18 solids placed in the Interim Drying Facility (IDF) in 2011.
- Worked on establishing parameters for shear strength and consolidation testing of surrogate lime-amended treatment solids.
- Began preparation of the Preliminary Design Report for the solids repository.
- Began preparation of the Dolores County Land Use Application and associated documents for a Certificate of Designation for the solids repository.
- Continued work to secure lands needed for a permanent solids repository. The footprint of the SSR-A will easily fit within the area of the US Forest Service tract known as STA-2. This tract is approximately 8 acres in size and qualifies as a mineral fraction under the Small Tracts Act for private acquisition. AR and it contractors are continuing preparation of the application for acquisition of this parcel through the Small Tracts Act.

Task D – Hydraulic Control Measures for the Collapsed Area of St. Louis Tunnel Adit

- Continued evaluation of six options to access a suitable location in the Hermosa Formation portion of the St. Louis Tunnel for hydraulic control. These include 1) a base case with continued drainage through the debris plug, plus monitoring wells to evaluate hydraulic head in the tunnel; 2) similar to the base case but with sub-horizontal relief wells to control hydraulic head behind the debris plug; 3) sub-horizontal well drains plus plugging of the debris plug; 4) construction of an interception wall immediately downstream of the debris plug to intercept mine water lost into the colluvium; 5) traditional tunneling; and 6) open-cut method with retaining walls to fully expose the intact rock portion of the tunnel.
- Evaluation of these options includes, as necessary, contacts with directional drilling contractors to further identify and characterize potential issues with these technologies to penetrate the colluvium and colluvial debris blanketing the Hermosa Formation and blocking the St. Louis Tunnel at the end of the adit collapse area.

Task E – Source Water Investigations and Controls

- 517 Shaft Injection Test
  - Continued preparation of a treatability study report to document implementation of the 2012 517 Shaft Injection Test and interpretation of results.

- Field Implementation Plan completed for removal of injection test chemical and all injection test equipment and materials.
- Began deconstruction and demobilization of 517 Injection Test system the first week of August and completed demobilization August 23. Work included:
    - The twenty five percent (%) sodium hydroxide (NaOH) solution was extracted from the injection tank during the week of August 5. Approximately 1,195 gallons were removed on August 5 and transported by tanker truck to an EPA site in Silverton, Colorado. The tanker truck returned on August 7 to remove remaining NaOH from injection tank, but operation was shut down due to inclement weather. Remaining NaOH (approximately 3,435 gallons) was removed from the injection tank on August 8 and transported off-site. Approximately 175 gallons of NaOH material remained in the injection tank.
    - Primary and secondary generators were removed from site on August 9.
    - All injection lines from injection pumps to the 517 shaft were flushed with approximately 100 gallons of fresh water on August 12 in preparation for removal of the lines. Fill ports and injection lines into the injection tank were flushed and removed on August 13.
    - Injection tank was to be removed on August 14. A 30-ton crane was mobilized to the 517 site. However, upon attempting to remove the tank, the crane's capacity was reached without lifting the tank from the ground. Work was stopped and the crane was demobilized. The tank fluid level was verified (175 gallons remaining) and the manufacturer was contacted to verify the tank weight. An incorrect tank weight was provided by the vendor causing the tank lift to be delayed.
    - All injection lines and electrical components outside of the 517 tunnel were removed from the 517 site on August 15 to 16, and on August 20.
    - The injection tank was removed on August 22 using of a 60-ton crane. The lift was successful and the tank was demobilized from the site. The tank vendor confirmed in writing that remaining NaOH chemical in the injection tank could be returned with the tank and would be properly disposed at the vendor's cleaning facility.
    - All remaining miscellaneous 517 Injection Test equipment and materials (spill guards, piping, etc.) was removed from the 517 site on August 22 - 23.
- Treatment performance sampling and monitoring continued to be performed at DR-3A in general accordance with the 517 Shaft Injection Test Work Plan Addendum. Sampling frequency was twice a week (Monday and Thursday) and was reduced to once a week (Monday) on August 21. Sampling will continue into September.
- The EPA's contractor (Weston) provided in-tunnel support on August 21 and 22, 2013.
    - Water samples were collected from the 517 Shaft on August 21, 2013.
    - The injection hose suspended down the 517 Shaft and the air/vacuum valve were removed from the 517 Shaft Access Tunnel.
    - Using a base neutralizing solution and 5% acetic acid solution (white vinegar), Weston personnel continued neutralizing the NaOH solution released onto the floor of the 517 Shaft Access Tunnel from a minor seep on the injection system air/vacuum valve. Additional neutralization is anticipated to be performed in September 2013.
    - Collected three 1-gallon samples from the 517 and Blaine tunnels
        - One sample from the bottom of the 517 shaft
        - One sample in-by from the Blaine Parshall flume
        - One sample out-by from the Blaine Parshall flume

- Continued Blaine Tunnel water depth and flow monitoring behind the Blaine Coffer Dam and Blaine Flume.
    - Water level and flow data continued to be logged.
    - Two water samples were collected from the Blaine Tunnel on August 21, 2013.

Task F – Water Treatment System Analysis and Design

- Continued constructed wetland pilot-scale testing.
  - Inspections were performed on August 14, 15, and 27, 2013.
  - Influent and effluent flow rates were measured to be approximately 2.8 gpm and 2.1 gpm, respectively, on August 27, 2013.
  - Sampling and monitoring were performed in general accordance with the Sampling and Analysis Plan (SAP). Water samples were collected from the inlet flow control box, rock drain monitoring port, and wetland outlet and submitted for laboratory analysis on August 14, 2013.
- Continued preparation of a report documenting winter 2012-2013 constructed wetland pilot-scale testing activities, observations, and analytical results.
- Continued wetland demonstration treatability study activities.
  - Completed flocculant/organic coagulant and Gunderboom® permeable curtain bench-scale testing to evaluate particulate removal in the settling basin of the constructed wetland demonstration.
  - Completed and submitted the *St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study Work Plan* (Constructed Wetland Demonstration Work Plan) to the EPA on August 14, 2013.
  - Commenced construction of the Constructed Wetland Demonstration in August 2013. Completion of the following work tasks were underway at month's end:
    - Performed air monitoring at demonstration wetland construction area to monitor air impacts. Results showed negligible lead levels in air.
    - Placed grade stakes throughout the demonstration wetland construction area to construct site features.
    - Clearing and grubbing and rough grading of the wetland area began, particularly the rock drain and aeration channel areas. Exclusion zones and contamination reduction zones set up for excavation of calcine material from subgrade.
    - Hauled approximately 108 loads (756 cubic yards) of calcine material to Drying Cell 4.
    - Placed erosion control measures for controlling runoff from work area.
    - Imported 1,211.09 tons of Type A material to the north staging area.
- Completed ion exchange bench-scale isotherm testing of the St. Louis Tunnel discharge (DR-3A) in accordance with the *St. Louis Tunnel Discharge Ion Exchange Bench-Scale Treatability Study*

ACTIVITIES FOR UPCOMING MONTH

This section describes developments expected to occur during the upcoming reporting period, including a schedule of work to be performed, anticipated problems and planned resolution of past or anticipated problems.

Site-Wide Activities

- Complete, review and post the June and July 2013 Surface Water Sampling Reports and cross sectional transect data to the project SharePoint site in September 2013. https://www.aecomonline.net/projects/Rico
- Begin review of the August 2013 Surface Water Sampling Report and cross sectional transect data.
- Continue reviewing the digitally archived historic documents and maps.
- Review and finalize the draft avalanche hazard study report for the St. Louis Ponds Site and the Argentine Mill Site/Access Road.
- Perform ground penetrating radar along St Louis Ponds site access gravel road to identify existing voids

Task A – Pre-Design and Ongoing Site Monitoring

- Conduct surface water and groundwater sampling/analyses and flow measurements per protocols contained in the SAP.
- Post surface water quality data to the SharePoint site after QA/QC review; and submit EQuIS data downloads to URS/EPA pending completion of EQuIS database.
- Download data from the Parshall flume data collectors and post to the project SharePoint site.
- Continue testing on the site Data Management System in preparation for system rollout.
- Complete monthly inspection of St. Louis Pond system. Perform detailed inspection of Pond 18 embankments and condition.
- Continue development of the CSM.
  - Begin installing new monitoring wells throughout the St. Louis Ponds area.
  - 20 boreholes (installing 19 monitoring wells).

Task B – Management of Precipitation Solids in the Upper Settling Ponds

- Begin dredging work for the solids removal during September on Ponds 11 and 12.
- Repairs to be completed at Pond 18
- Continue evaluation of calcine tailings/Pond 18 solids SPLP and associated geochemical testing.
- Begin geophysical sub-bottom pond profiling to identify volume of solids and possible underlying calcines on up to 11 of the St. Louis ponds.
- Secure pipeline to ground surface, either through engineering controls (i.e. engineered straps and posts) to keep the pipeline in place and on grade or by constructing a bench system adjacent to the pond dikes to seat the pipeline.
- Operation of the water pipeline system during dredging operations.
- Continue maintaining the integrity of the pond dikes as required by the project.

Task C – Design and Construction of a Solids Repository

- Continue design of a phased solids repository at the SSR-A site.
- Continue geotechnical analyses and review to support design of a permanent drying facility and repository, including ongoing laboratory testing.
- Submit the Preliminary Design Report for the solids repository.
- Continue preparation of the Dolores County Land Use Application and associated documents for a Certificate of Designation for the solids repository.
- Continue efforts to secure access to lands needed for a permanent drying facility and solids repository.

Task D – Hydraulic Control Measures for the Collapsed Area of St. Louis Tunnel Adit

- Monitor/download data from the transducer at drill hole AT-2.
- Continue with feasibility evaluation of options to access a suitable location in the Hermosa Formation portion of the St. Louis Tunnel for a hydraulic control.
- Continue evaluation of potential for in-mine storage of St. Louis Tunnel flows behind the planned bulkhead.
- Begin drilling incline boreholes targeted into St. Louis tunnel.
- Begin geophysical surface profiles of the area outside of the collapsed tunnel to identify depth to bedrock and depth to GW table.

Task E – Source Water Investigations and Controls

- Perform post-injection water quality monitoring at the 517 Shaft.
- Perform post-injection water sampling and monitoring at DR-3A.
- Complete the treatability study report documenting implementation of the 2012 517 Shaft Injection Test and interpretation of results.

- Commence preparation of a treatability study report documenting implementation of the 2013 517 Shaft Injection Test and interpretation of results.
- Continue Blaine Tunnel water depth and flow monitoring behind the Blaine Coffer Dam and Blaine Flume.
- Continue work on compiling relevant historic mine workings and data from ongoing EPA studies into an AutoCAD 3D model of the mine workings reporting to the St. Louis Tunnel.

Task F – Water Treatment System Analysis and Design

- Continue constructed wetland pilot-scale testing.
  - Continue flow through the pilot-scale wetland to evaluate seasonal and longer-term changes to the system with reduced sampling and monitoring.
  - Complete the report documenting the winter 2012-2013 pilot scale testing activities.
- Continue wetland demonstration treatability study activities.
  - Continue construction of the wetland demonstration.
- Continue evaluation of ion exchange treatment technology by performing bench-scale ion exchange column testing.
- Continue work on updating an existing model to predict discharges from the St. Louis Tunnel.
- Continue scoping additional data needs as necessary related to treatment system alternatives.

If you have any questions, please feel free to contact me at (951) 265-4277.

Sincerely,

Anthony R. Brown
Project Manager
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